

WHAT IS CLAIMED:

1. An expression assay, comprising contacting a target nucleic acid with a probe immobilized on a microarray under conditions that allow hybridization between said target nucleic acid and said probe, said target nucleic acid having at least one phosphorothioate moiety.
2. The method of claim 1, further comprising labeling said target nucleic acid by conjugating a reporter molecule to said phosphorothioate moiety.
3. The method of claim 2, wherein said labeling step comprises reacting said target nucleic acid with a conjugating moiety that specifically reacts with said phosphorothioate moiety, followed by reaction with a labeling moiety that specifically reacts with said conjugating moiety.
4. The method of claim 2, wherein said labeling step follows said contacting step.
5. The method of claim 2, wherein said reporter molecule has an electrophilic moiety.

6. The method of claim 3, wherein said conjugating moiety is an electrophilic moiety.
7. The method of claim 5, wherein said electrophilic moiety is selected from the group consisting of a maleimide and an iodoacetamide.
8. The method of claim 2, wherein said reporter molecule is selected from the group consisting of a fluorophore, a redox moiety, and an electrochemically active agent.
9. The method of claim 2, wherein said reporter molecule is selected from the group consisting of TMR-maleimide, TMR-iodoacetamide and ALEXAFLUOR-maleimide.
10. The method of claim 1, wherein at least one nucleotide is a ribonucleotide.
11. The method of claim 10, wherein said target nucleic acid has at least three different thio ribonucleotides, said thio ribonucleotides being selected from the group consisting of an adenosine thiophosphate, a cytidine thiophosphate, a guanosine thiophosphate, a thymidine thiophosphate, and a uridine thiophosphate.

12. The method of claim 1, wherein at least one nucleotide is a deoxyribonucleotide.
13. The method of claim 12, wherein said target nucleic acid has at least three different thio deoxyribonucleotides, said thio deoxyribonucleotides being selected from the group consisting of an adenine deoxyadenosinethiophosphate, a deoxycytidinethiophosphate, a deoxyguanosinethiophosphate, and a thymidinethiophosphate.
14. The method of claim 1, wherein said target nucleic acid is selected from the group consisting of cRNA and cDNA.
15. A method for detecting single nucleotide polymorphism, comprising extending a probe hybridized to a target by exactly one base by incorporating a compound selected from the group consisting of a dideoxynucleoside α -thio triphosphate and an acyclonucleoside α -thio triphosphate.
16. The method of claim 15, further comprising labeling the extended probe by conjugating a reporter molecule to the thio moiety of said incorporated compound.

17. The method of claim 16, wherein the reporter molecule is selected from the group consisting of TMR-maleimide, TMR-iodoacetamide, Alexafluor-maleimide, and bromo-bimane.

18. The method of claim 15, wherein said dideoxynucleoside α -thiotriphosphate is at least one of the group consisting of dideoxyadenosine α -thiotriphosphate, dideoxycytidine α -thiotriphosphate, dideoxyguanosine α -thiotriphosphate, 3'-deoxythymidine α -thiotriphosphate, and dideoxyuridine α -thiotriphosphate.

19. A polynucleotide, comprising at least one residue of the group consisting of an adenosine thiophosphate residue, a deoxyadenosine thiophosphate residue, a cytidine thiophosphate residue, a deoxycytidine thiophosphate residue, a guanosine thiophosphate residue, a deoxyguanosine thiophosphate residue, a thymidine thiophosphate residue, and an uridine thiophosphate residue, and at least one moiety bonded to said at least one residue, said moiety selected from the group consisting of a maleimide and an iodoacetamide.

20. The polynucleotide of claim 19, wherein said moiety is selected from the group consisting of TMR-maleimide, TMR-iodoacetamide and Alexafluor-maleimide.

21. The polynucleotide of claim 19, further comprising a probe hybridized thereto.
22. The polynucleotide of claim 19, further comprising a probe hybridized thereto, said probe being attached to a microarray substrate.
23. The polynucleotide of claim 19, wherein said polynucleotide is cRNA.
24. A molecular probe, wherein said probe terminates in a moiety selected from the group consisting of a thio dideoxynucleotide and an thio acyclonucleotide.
25. The probe of claim 24, wherein said probe is a nucleic acid probe.
26. The probe of claim 24, wherein said probe is bound to a microarray substrate.
27. The probe of claim 26, wherein said probe is a nucleic acid probe and is hybridized to a target nucleic acid.
28. A microarray, comprising at least one molecular probe, said probe terminating in a moiety selected from the group consisting of a thio dideoxynucleotide and a thio acyclonucleotide.
29. A nucleic acid, said nucleic acid comprising at least three residues of the group consisting of an adenosine thiophosphate residue, a deoxyadenosine thiophosphate residue, a cytidine thiophosphate residue, a deoxycytidine

thiophosphate residue, a guanosine thiophosphate residue, a deoxyguanosine thiophosphate residue, a thymidine thiophosphate residue, and a uridine thiophosphate residue.

30. The nucleic acid of claim 29, comprising at least four residues of the group consisting of an adenosine thiophosphate residue, a deoxyadenosine thiophosphate residue, a cytidine thiophosphate residue, a deoxycytidine thiophosphate residue, a guanosine thiophosphate residue, a deoxyguanosine thiophosphate residue, a thymidine thiophosphate residue, and a uridine thiophosphate residue.

31. The nucleic acid of claim 29, comprising a labeling moiety conjugated to a thiophosphate moiety in at least one of said residues.

32. A nucleic acid, comprising cRNA having a thiophosphate nucleotide.

33. A cRNA comprising at least one residue selected from the group consisting of an adenosine thiophosphate residue, a cytidine thiophosphate residue, a guanosine thiophosphate residue, and an uridine thiophosphate residue.

34. An expression assay kit, comprising a labeling reagent, and a nucleotide reagent, said labeling reagent comprising a thioreactive compound, and said nucleotide reagent comprising a nucleoside α -thiotriphosphate.

35. The kit of claim 34, wherein said nucleotide reagent is at least one of the group consisting of adenosine α -thiotriphosphate, cytidine α -thiotriphosphate, guanosine α -thiotriphosphate, and uridine α -thiotriphosphate.

36. The kit of claim 34, wherein said thioreactive compound is selected from the group consisting of a maleimide and an alkyl iodide.

37. A single nucleotide polymorphism assay kit, comprising a labeling reagent, and a nucleoside triphosphate, said labeling reagent comprising a thioreactive compound, and said nucleoside triphosphate comprising a compound selected from the group consisting of a dideoxynucleoside α -thiotriphosphate and an acyclonucleoside α -thiotriphosphate.

38. A method of labeling a nucleic acid that terminates in a residue selected from the group consisting of a dideoxyadenosine thiophosphate residue, a dideoxyguanosine thiophosphate residue, a dideoxycytidine thiophosphate residue, a 3'-deoxythymine thiophosphate residue, and a dideoxyuridine thiophosphate residue, comprising reacting said nucleic acid with a thioreactive compound.

39. A method of labeling a nucleic acid that terminates in a residue selected from the group consisting of an acycloadenosine thiophosphate residue, an

acycloguanosine thiophosphate residue, an acyclocytidine thiophosphate residue, a 3'-acyclothymine thiophosphate residue, and an acyclouridine thiophosphate residue, comprising reacting said nucleic acid with a thioreactive compound.